

With the following corrections
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(T.G.)

Reprinted from ANNALS OF GYNÆCOLOGY AND
PÆDIATRY, April, 1890.

The Value of the Graduated Bath and
Pack in the Treatment of Catarrhal
Pneumonia in Children.

BY EDWARD P. DAVIS, M.D.,
*Professor of Obstetrics and Diseases of
Children in the Philadelphia Polyclinic,
Visiting Obstetrician to the Phila-
delphia Hospital, etc., and*

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It is not the purpose of the writers
of this article to claim exclusive util-
ity for the graduated bath and pack
in the treatment of pneumonia in chil-
dren, but to call attention to its value
in connection with other remedial
agents, and especially in preventing
the congestion of the capillaries of

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613,

the lung, which is so prominent a feature in this disease. The series of cases to which reference is made were children in the wards of the Philadelphia Hospital. Many of them were foundlings recently admitted, ill nourished and anæmic, while others were patients who had enjoyed the benefits of hospital care for a longer period, and were better nourished and hence better able to resist disease. Twelve of the cases to which reference is made were young and feeble children recovering from an epidemic of whooping-cough, ranging in age from twelve weeks to five years, and many of them foundlings. Others of these cases have occurred in out-patients at the Philadelphia Polyclinic, where the intelligent carrying out of the treatment was possible only by the supervision of a trained nurse.

It is not claimed that this method of treatment is useful just before

death, nor is it valuable as a routine method of treatment, but when under intelligent supervision.

The method consists in placing the child in a bath of warm water at a temperature of from 98° to 105° F., into which sufficient mustard has been placed to redden the child's skin ; a cloth wrung out in cool water is placed upon the head. It is allowed to remain in the bath from five to fifteen or twenty minutes. The duration of the bath will depend upon the child's temperature, the frequency of its respiration and the presence or absence of coma or delirium. Should the child be thirsty while in the bath, a teaspoonful of water may be given, or whiskey and water, or aromatic spirits of ammonia and water.

The child, when removed from the bath, is carefully enveloped in a warm blanket, and a can full of hot water is placed at its feet ; and if the severity

of the case demands, a piece of old soft flannel sufficiently wide to cover the body from the chin to the umbilicus is wrung out of water the temperature of the room, or slightly cooler. Spirits of turpentine or spirits of camphor are freely sprinkled upon it, and the child's chest is enveloped by the flannel ; this is allowed to remain until dried by the heat of the body. Should prostration be marked, stimulants are freely given. In cases where fever and stupor are excessive the bath may be gradually cooled down to 85° or 80° F., while stimulants are freely administered. The indications for this treatment have been a rise in temperature above 102° F., rapid pulse and respiration, with disturbance of the cerebral functions. This treatment has been substituted for the use of emetics and nauseating expectorants, and the results have been such as to justify its

employment in the future, and to warrant the calling of the attention of the profession to this expedient among our therapeutic resources.

It is distinctly not claimed that this method is original, as it has frequently been employed, but reference to the literature on the subject, and reference to the methods at present employed at the polyclinics of Europe, lead us to believe that it is not so frequently used as might be profitable to physician and patient.

The twelve cases of whooping-cough, to which reference has been made, were all complicated by bronchitis. In two of these cases the vomiting and prostration which so often accompany whooping-cough, were present in marked degree. So far as the treatment of the whooping-cough is concerned, antipyrin in amounts ranging from $\frac{1}{2}$ grain to 16 grains in twenty-four hours was found

the most efficient remedy. The cases of bronchitis, which were especially severe, may be described as follows :

CASE I.—N. F., aged 15 months ; marked bronchitis of smaller tubes ; chest full of fine râles ; small patch of pneumonic consolidation at base of left lung. Maximum temperature, $104.2-5^{\circ}$ F.

CASE II.—W. M., aged 1 year ; bronchitis limited to the larger tubes.

CASE III.—V. M., aged 12 weeks ; diffuse bronchitis of the larger tubes.

CASE IV.—E. C., aged 6 months ; extensive capillary bronchitis, with complete consolidation of the base of the left lung. Maximum temperature, 104° F.

CASE V.—J. M., aged 5 months ; extensive bronchitis of the larger tubes. Maximum temperature, $103.4-5^{\circ}$ F.

CASE VI.—H. V. ; extensive capillary bronchitis. Maximum temperature, $103.4-5^{\circ}$ F.

The remaining six cases of whooping-cough were complicated by bronchitis of different degrees of severity, but not sufficiently violent to occasion anxiety.

The medicinal treatment of these cases consisted in the administration of antipyrin in small doses to relieve paroxysmal cough ; when the element of spasm disappeared chloride of ammonium was given freely, and whiskey and aromatic spirits of ammonia when stimulants were required. No opium was given, but antipyrin was used with marked success as a nervous sedative. It was particularly successful in relieving vomiting when preceded by irrigation of the stomach with a warm solution of bicarbonate of sodium.

The cases of N. F., E. C., H. V. presented catarrhal pneumonia in great severity. Consolidation could be distinctly outlined, the patients

were almost continually slightly cyanosed and very dull and stupid, and when this condition became well marked, a cold, camphorated pack was resorted to ; and when, in addition to the drowsy condition of the child, high temperature was a prominent feature, the patient was given a hot mustard bath, at a temperature of 105° F., the temperature of the water being gradually reduced to 95° or 90°. They remained in this bath for thirty minutes, unless the indications required removal previously, and directly after being rubbed were placed in the cold, camphorated pack. In all cases this procedure was followed by satisfactory results, the patient's temperature falling and the drowsiness and stupidity disappearing. At the same time stimulants were resorted to and ammonium chloride freely given.

All of the twelve cases of whooping-cough complicated by bronchitis

recovered, although some presented consolidation as a symptom, and the patients were extremely ill.

A reference to American and English journals shows that the bath and pack have been employed by others even more vigorously than in our cases, and with success. As a rule, from two to six applications of the bath and pack during twenty-four hours were sufficient with us for the most serious cases.

Phillips (*New York Medical Journal*, 1888, pp. 432 to 435), advises an emetic, followed by a steam bath and the use of camphor and stimulants. When the child is cyanotic and suffering from pneumonia, he has found the steam bath especially useful.

Holt (*New York Medical Journal*, 1886, p. 637) reports a case of pneumonia in a child 11 months old, in which a high temperature reaching 106° F. persisted for six days, and the

temperature reached 107° on two occasions; lukewarm baths were used with temporary benefit, the patient finally succumbing.

Blackwell (*Philadelphia Medical Times*, Vol. 13, pp. 885 to 889) quotes Bartels as giving a mortality in catarrhal pneumonia of 100 per cent. of all cases under 1 year; after that, 33 1-3 per cent.

Ziemssen is quoted as losing 50 per cent. of all cases under 1 year, 66 2-3 per cent- from 1 to 3 years old; after that, 25 per cent.

Blackwell applied a mustard poultice and blister on the entire chest.

Brown (*Transactions Medical Society of Virginia*, 1882, Vol. 13) gave a hot mustard bath every two hours to a child suffering from double pneumonia, whose respirations were almost 100. The bath was followed by brisk friction with a dry flannel, stimulants

were given internally, and dry cups placed over the chest.

Sholl (*Medical and Surgical Reporter*, 1883, pp. 725 and 727) reports two cases of pneumonia in children with very high temperature and cyanotic symptoms treated by the hot bath, followed by a pack between two blankets. The patients remained in the bath seven hours, and when removed the temperature was greatly reduced. Rapid recovery followed the bath; in neither case was it repeated.

Among English physicians we find Goodhart mentioning baths as a resort in the failure of other remedies. ("Guide to the Diseases of Children," 1889.)

Day, physician to the Samaritan Hospital for Women and Children, London (*British Medical Journal*, 1883, pp. 725 and 727), reports a case of croupous pneumonia in a child successfully treated by the cold bath.

The child was aged 13. Half of the left lung was consolidated. The temperature, 104.2-5°; the pulse, 140; respiration, 56; in a condition of apathy; became later unconscious; placed in a bath of 90° F.; lumps of ice added and gradually chilled until temperature of bath reached 70° F.; remained in bath seven minutes; temperature, 100.6-10°; in two hours temperature rose to 104°; bath repeated for eight minutes; temperature again fell to 100.6-10°. The baths were repeated as often as the temperature rose, and the condition of the patient demanded. Such baths may be repeated every three hours. It is claimed by Day that the mortality is lower than in other treatment.

Flint, of New York, was accustomed to use a wet sheet when the patient was unconscious, the fever high and the disease uncomplicated. The child was rolled in a sheet wrung

out of water at a temperature of 80°, and every ten or fifteen minutes the sheet was sprinkled with water of the same temperature.

Morrill (*Cyclopædia of Diseases of Children*, Philadelphia, 1889), writes that the child may be gently submerged in a bath of a temperature of 100° F., remaining ten or fifteen minutes, wrapped up at once in a blanket, and then taken out and put on a bed, when it frequently gets a refreshing sleep. This may be repeated in broncho-pneumonia several times a day if necessary to reduce high temperature. The temperature of the bath can be gradually lowered to 80°, and a little brandy administered while the child is submerged.

So far as clinical usage goes at the present day, the graduated bath and pack are spoken of as an expedient, but not as recognized methods of treatment. Thus, Henoch advises

the use of dry cups and enveloping the chest in cloths rung out of water, and also the use of the steam bath; but his reliance, in cyanosis and prostration, is more upon stimulants and emetics given by the stomach.

Monti prescribes an expectorant mixture composed largely of senega and nauseants.

Wiederhofer would add counter-irritation over the chest, and occasionally wearing a jacket.

Baginsky, and the majority of Continental pædiatrists, mention the bath and pack incidentally, and as of secondary importance.

Reference to the two leading pædiatric journals of the Continent, fails to find any mention of this treatment during the past five years.

In addition to the cases of pneumonia following whooping-cough, to which reference has been made, we have treated a considerable number of

cases of pneumonia in children of all ages by this method.

In hospital practice under the care of resident physicians and trained nurses, it is quite practicable to have baths given as frequently as the indication demands, but outside of a hospital where, in the absence of a trained nurse, so much is to be left to the discretion of the mother, it is far more difficult to carry out this method of treatment.

In our hospital cases, children as young as 3 or 4 days have been treated in this manner with excellent results. If taken promptly the congestion which marks the advent of broncho-pneumonia may be speedily relieved in this way.

A recent case of a girl aged 3 years illustrates this remark. She had been in fair health and manifested no symptom to attract the attention of

the nurse in whose care she was. Following a slight cough during the morning, her temperature rose in the following afternoon to 107 F. ; there was no stupor, not much distress, rapid respiration, rapid pulse, and over the chest a harsh, sonorous breathing without râles. The patient was placed at once in a bath followed by a camphorated pack. Small doses of antipyrin were given, and subsequently stimulants were the chief elements of treatment. Her temperature fell from four o'clock in the evening to four o'clock the next evening to 99 F. without prostration. She was ill for a few days, and made a good recovery. A subsequent examination of the chest showed disseminated bronchitis of moderate grade of severity, and the harsh sonorous quality of the breathing, which lasted for the first few hours after the bath, never re-

turned. The following is a chart of her temperature. (Chart 1.¹)

We also append the temperature curve of M. M., aged 3 days, in whom a diagnosis of umbilical sepsis was made by the physician in attendance. Closer examination of the patient disclosed the beginning of bronchopneumonia. History and treatment are as follows :

Baby, M. M., 3 days old, left chest impaired in resonance; blowing breathing; no râles; respiration, 100. Whiskey, drops 3, and aromatic spirits of ammonia, drops 2, every hour during the night with two mustard baths; next morning child was worse; respiration 120; temperature 104². Treatment, mustard baths three times during the day, whiskey and ammonia every hour, and cotton jacket on the

¹ We are indebted to Dr. MacFarland, of the present resident staff, for these charts and data regarding these cases.

chest when not in the bath. Blowing breathing over the entire chest ; no distinct dulness. At 7 o'clock that night child was pale, with bluish circles about the eyes. Respiration, 88 to 127 per minute. Treatment, two mustard baths during the night, stimulants and jacket. The next morning the child much better ; dulness in the right axillary region. On the morning following, all treatment discontinued except the jacket. Four days afterward the child was well.

(Chart 2.)

We also add the history of a second case in a young child as follows :

M. S., aged 4 days, catarrhal pneumonia and chest full of mucous, sibilant and sonorous râles ; no dulness on percussion. The next day temperature of the child 103° ; dulness at the left apex, bronchial breathing and râles ; three days afterward the child was well. The treatment was stimu-

lants, and baths and packs three times daily for the first three days of the illness ; the child did not cough at any time. The temperature chart of this case is added. (Chart 3.)

In private practice it is sometimes necessary for the physician, in order to carry out such treatment safely, to devote an hour or more of his time to his patient.

On a recent occasion we found it necessary to improvise a bath-tub by taking the family wash-tub, and giving the bath ourselves, while the mother and her friends looked on with mingled amusement and anxiety. The case was that of a girl aged 6, whose temperature had remained at 104° F. for thirty-six hours, resisting ordinary methods of treatment. Following the bath and pack her temperature fell, and her respiration became markedly less harsh and con-

valescence began. She subsequently made a good recovery.

We, conclude, then, from our study and observation of these cases, that the graduated bath and stimulating pack is a means of treatment in pneumonia which is efficient, and in our cases has not been attended by shock or prostration. We have used antipyretic drugs as little as possible ; the only one has been antipyrin, and that has been employed in small doses, repeated when possible at regular intervals, and as a nervous sedative and not as an antipyretic.

We have found that as the congestion in the lung was relieved, the temperature fell, respiration became free, and the patient's strength improved. We have not found it necessary to give opium in any form in a series of fifty cases so treated, nor have we found any advantage in those expectorants which tend to nauseate.

In feeding young children we have resorted to equal parts of sterilized cows' milk, and sterilized water when the child could not nurse, and with good results. Small dry cups, so made that the suction exerted upon the skin is very moderate indeed, were useful in relieving congestion, and frequent changes in the posture of the child, avoiding sudden rising to the sitting posture, were also useful.

We have taken special pains to look out for any symptoms of prostration, shock or collapse accompanying this treatment, but when carefully employed we have failed to observe any such results.

It is quite possible that many cases in robust children in private practice would not require anything more than a turpentine stupe and cotton jacket. Poultices to the chest we have long ago discarded as far more injurious than helpful. As a result of

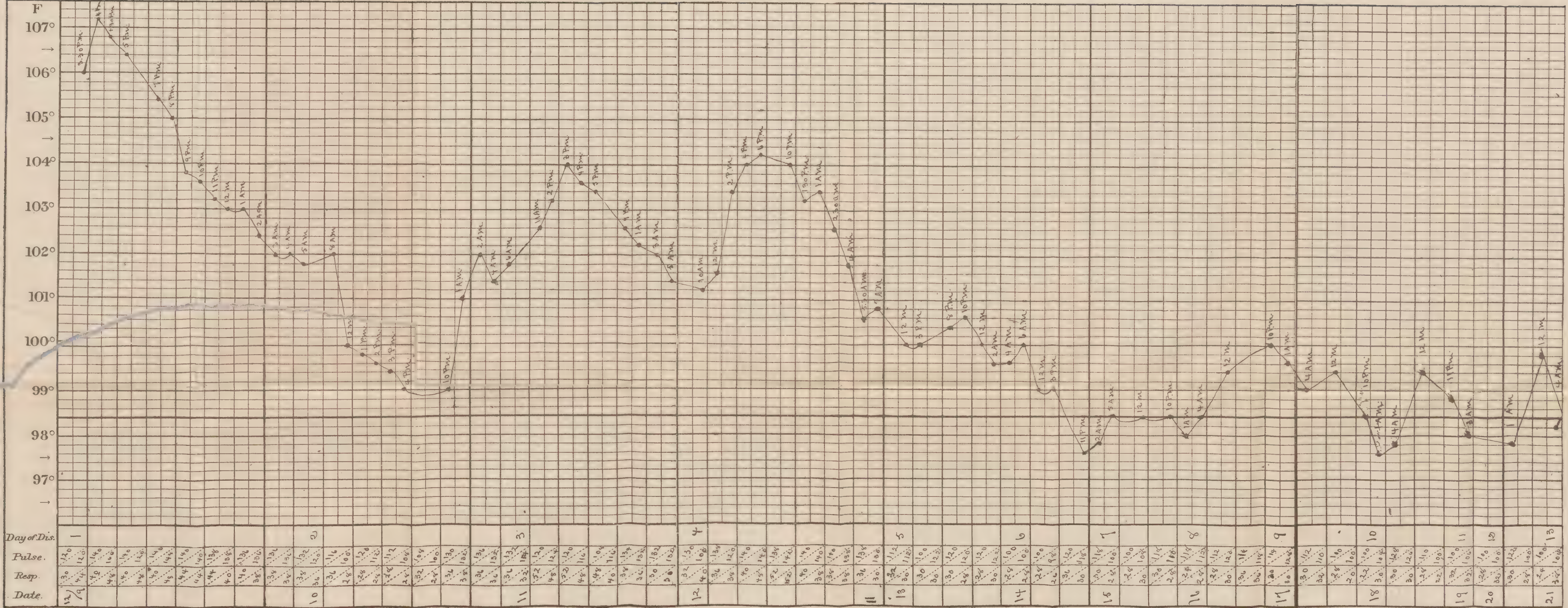
the baths and pack we have occasionally seen a moderate erythema, which has some times become papular but never pustular.

The common use of the bath and pack in treating pneumonia in adults is of comparatively recent date, and hence the literature upon this subject in pædiatrics consists in the reports of groups of cases rather than extended studies upon this subject.

Larvg. Ed. P. 4
Ashton, J. G.

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CHART No. 1.





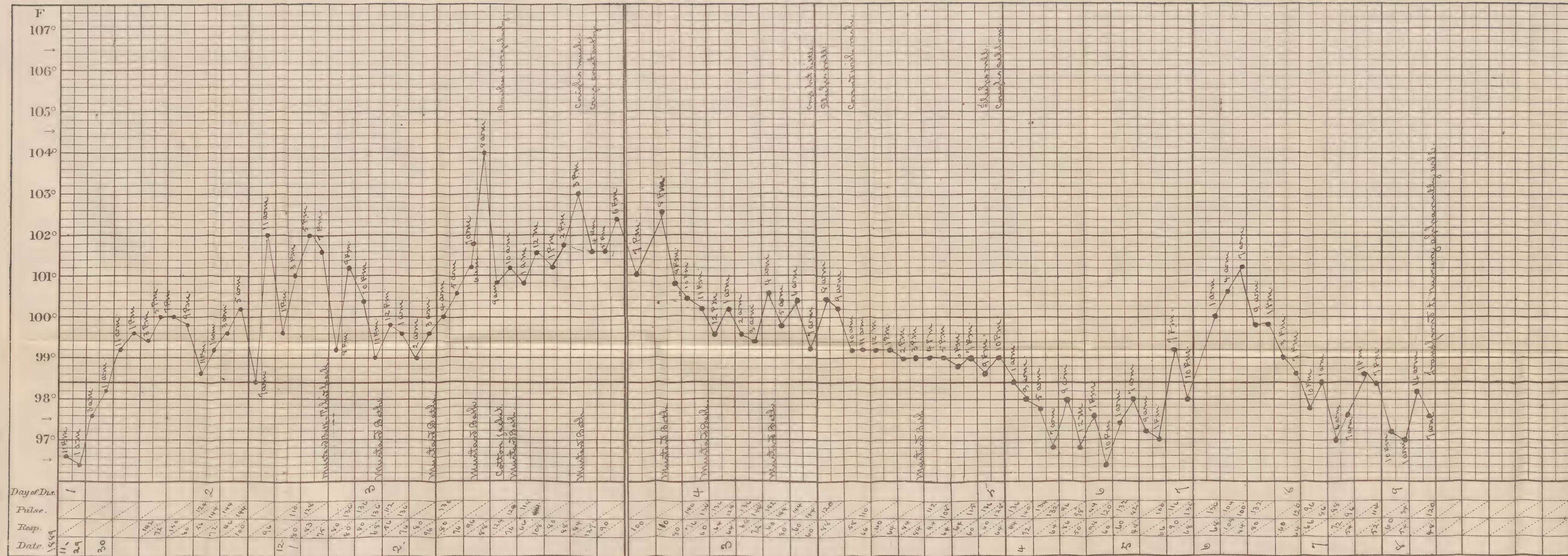
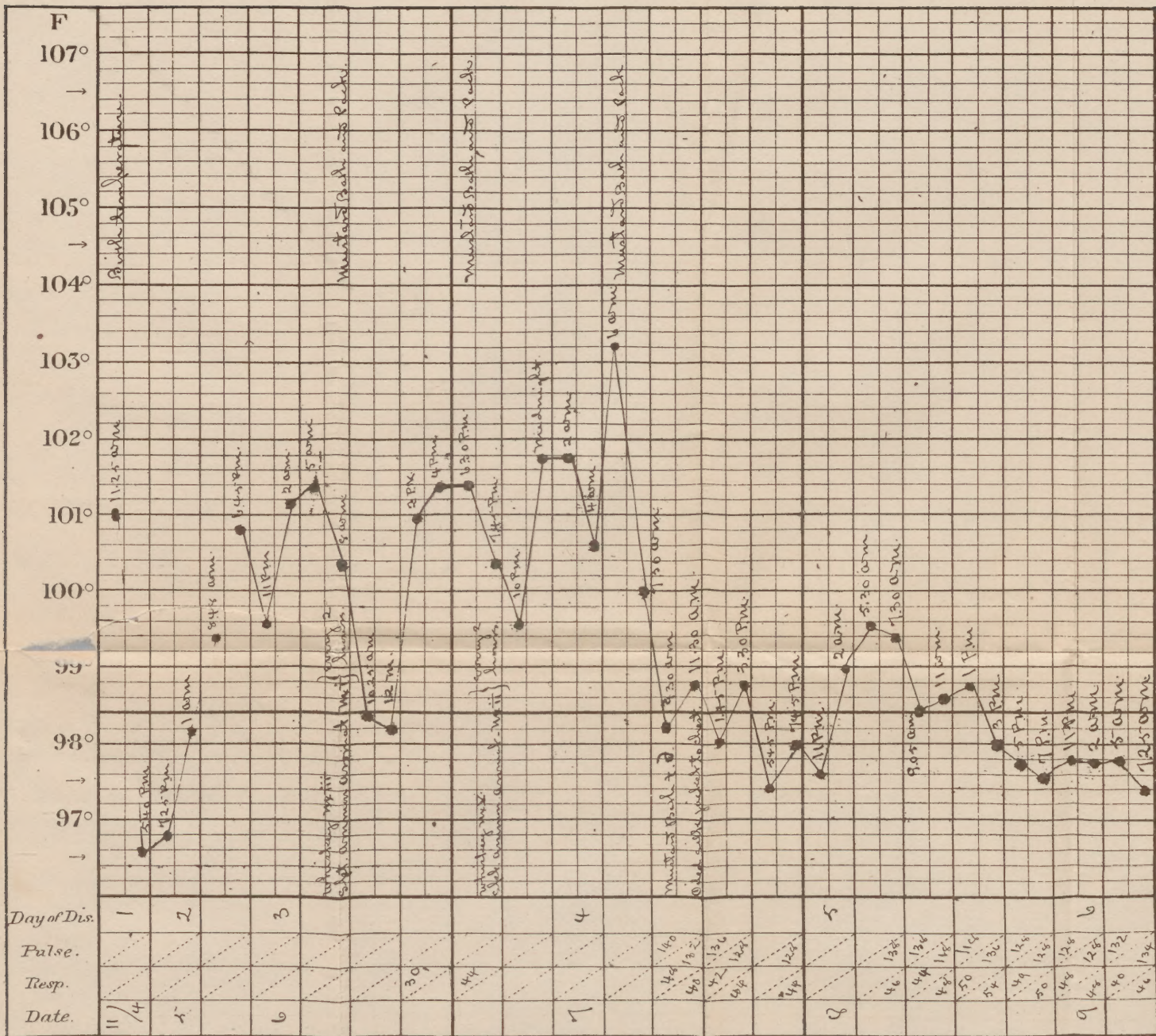


CHART No. 3.



F.

102°

100°

102°

104°

102°

102°

101°

101°

St. Paul and Shovel



